Implementation of Mentoring System Using J2EE Architecture: E-Mentoring

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Implementation of Mentoring System Using J2EE Architecture: E-Mentoring

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Abstract: Mentoring is a traditional method of transferring knowledge and skills from an established professional in an organization to an inexperienced member in the field. Education sector has found mentoring as quite effective tool since long back and with the advent of new technologies, comes an idea of online mentoring, which is also referred to as e-mentoring. Instead of face-to-face meetings, Online Mentoring System (OMS) uses asynchronous, electronic communications to establish and support the relationship between mentor and the student using virtual mode. E-Mentoring uses electronic medium to transfer knowledge and skills from mentor to student. It primarily focuses on student and faculty relationship. Online Mentoring System is a Client-Server model, which acts as an Interface between Mentor and student. OMS strives to reduce the work load of students in entering their details and at the same time enable the Mentors to assess their students more efficiently. E-Mentoring is fundamentally developed to improve the performance of students by assisting mentors to understand the problems of students more effectively and easily. In order to achieve this, a rating system is also included using which mentors can easily evaluate and sort the performance of the students and concentrate on those who need there guidance.

Keywords: e-Mentoring, Online, Mentor, System, Client, Server, Student, Relationship, Marks, OMS, Mentoring, Feedback, Efficiently, Performance, Admin, Guidance, Attendance, Implementing, Problems, Solution, Faculty.

I. INTRODUCTION

We are living in an advanced Computer age with a progressive technology where most of the works are performed using their Computers. Today Computer programming and Information Technology are invading each and every sector of education, business, banking, entertainment etc. E-Mentoring is a software application which is effectively designed to be used in educational sector for the purpose of mentoring. This system contains three users who are admin, mentors and students. The user admin assigns certain students to the mentors who are either a professor or an assistant professor or a teaching faculty by designation who has the concern for the improvement of their students in a college or academy. This e-mentoring system can also be referred as Online Mentoring System(OMS). It is effective, fast and also time saving system of mentoring. It primarily focuses on improving the mentoring process between the faculty and student in the college scenario. This system mainly enables the mentors to concentrate effectively on each and every student assigned to them. This system gives the

details of the students like information of attendance, marks of the students to all the mentors involved in the system, which empower the mentors to give proper guidance and right solution to the problems of each student. This system gives the students a private access to the feedbacks of their mentors which endeavors them for their self-improvement.
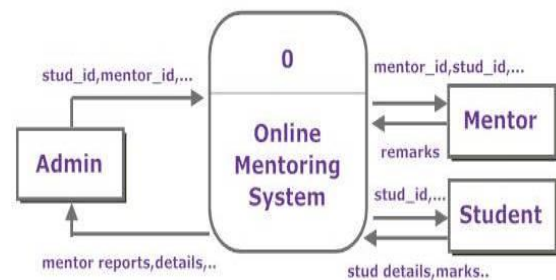

Fig. 1 Scenario of Online Mentoring System

The above Fig. 1 depicts the context level diagram for OMS which explains the whole process in a simplest way possible. It describes the three users of the system, the data that is flowing from each user into the system and the information that is generated from the system as per the requirement of each user. For example, the user admin can give mentor id, student id etc. as input data to OMS and could view mentor reports and other details of students and mentors as output information which are generated from OMS.

II. PROBLEM STATEMENT

The main problem focused here is the process of mentoring between faculty and the student. This process has to be done effectively because it will affect the future of the student as well as the academic institute, among which the foremost thing is betterment of student life. By effective mentoring not only the failure rate in academics reduces but also it will help the student to develop on the whole as an individual. The existing system was pen to paper system where the students are assigned to their respective mentors and the process goes on with noting down activities in a mentoring book. There is a high chance of losing this book before the student completes his education from the college or academy. The data entered in this book can be easily tampered hence it is not the secure way of storing data. Maintaining the mentoring book for each and every student is very tedious, time-

consuming, ineffective and complicated way of mentoring, thus it has not lived up to the expectation of lowering the failure rate of the students.

The proposed system which is Online Mentoring System provides very easy, clear and effective way of mentoring. This system shows solution to many problems existing in the current system and the proposed system works in the following way:

- Firstly the user admin gathers all the required information of available mentors and students. Then he creates login accounts for each one of them.

- Admin can add or remove the subjects of each semester according to curriculum.

- The user admin also assigns a group of students to each mentor.

- The details of attendance and marks secured by each student are entered into the system periodically.

- The user mentor starts mentoring the students after login in the application using the information of attendance, marks, etc. of the assigned students.

- The user student can also initiate for any guidance or solution to problem faced by the student to their respective mentor.

- Mentors after logging in the system will view all the information of the students like their past history, marks, attendance etc.

- Mentors can also view two different ratings, provided by the system for each student as per their attendance and marks secured, out of 10.

- Apart from these two ratings the system also provides another rating which is weighted average of above two ratings, which provides the overall performance of the student.

- Mentor can evaluate the performance of students by sorting the students according to these ratings.

- Depending on the information available of each student, Mentor can give right feedback to the students, which can be used by the student to solve their problems as well as take correct decisions.

III. RELATED WORK

Earlier studies compared traditional mentoring with online mentoring and proposed the necessity of e-mentoring in an organization. In this paper [3] Kimberly Nicole Rowland shows the benefits and limitations of e-mentoring compared with traditional mentoring by taking the help of suitable examples and case studies. In his work

new and innovative ways to use e-mentoring in an organization are clearly explained. It concludes by stating that objective of mentoring program is to establish win-win situations for all the employees, mentors and also finally benefit the organization. [2] Ellen A. Ensher, Christian Heun, and Anita Blanchard from USA presented a new methodology of mentoring based on different computer-mediated-communication (CMC) literature. Through this paper they describe how the context of CMC offers a host of unexplored and intriguing possibilities. This study has recommended the researchers and practitioners to explore online mentoring in an organization by suggesting specific propositions for the scope of future study.

Forming trust in E-mentoring: A Research agenda, [5] by Joanne D. Leck, Penny M. Wood from Canada presents a research agenda to better understand how trust is formed in e-mentoring. In their work they explained about importance of e-mentoring and the manner in which it is gaining popularity in recent days for providing a means of creating global access to mentors and hence reducing organizational training costs and also reducing both time and geographical constraints for mentors as well as mentees. This paper concluded that e-mentoring promises to be not only efficient but also an effective mechanism to assist workers to advance in their careers, however it is essential that trust between mentor and employee is formed as quickly as possible.

A Pilot study [7] was conducted by two institutions, Nayang Technological University, Singapore and Singapore polytechnic to test how successfully a peer-to-peer mentoring system could be established using both the features of synchronous as well as asynchronous communication. This paper's summary mentions the details about the things which worked well and which did not work so well. This study proved that even reserved students expresses his views through the forum, if this is implemented in the internet or any networked environment can certainly be an effective tool for promoting computer-mediated peer-to-peer mentoring. They suggested that well planned and executed projects of mentoring in an organization are possible through the electronic means which are very efficient and effective.

The authors of the paper, [1] Sandra L. Williams, Justin Kim, College of Education, University of Illinois, USA "E-mentoring in Online Course Projects: Description of an E-Mentoring Scheme", describes the structure and process of e-mentoring scheme designed as an applied learning component with for the students of master's degree in the university. In this paper they define e-mentoring as the process of using electronic means as the main channel of communication between mentor and

mentee which involves the passing of knowledge and skills between the parties. The authors have recommended that the full depiction of the scheme mentioned in this article may contribute to the design, development and implementation of other online mentoring schemes for use in higher education, electronic learning contexts, etc.

The paper [6] by shrestha et al, "From face-to-face to e-Mentoring: Does the 'e' add any value to mentors?" discusses about the similarities between face-to-face and online mentoring. This paper also reflects on the ways to enhance generic benefits of mentoring using electronic medium. The findings of this research gave insights on how the electronic medium allows the mentoring to reach each and every student without stigmatizing them and enable the mentors to manage the expectations of mentees in a better way. "E-mentoring in three voices", [4] was a paper presented by Lynn Akin and Janet Hilbun from Texas Woman's University. The three voices mentioned in the title of the article are about the voices of the best practice literature, a tenured professor and a junior professor in an academic institute. The article proposed that there is some debate about which works better, whether to have formal, institutional structure for mentoring or allow for the situations of serendipitous mentoring or how effective this online mentoring can actually be. However, research from [9] the Free Management Library (1997) suggested about the five fundamental assumptions about different mentoring situations: 1) Deliberate learning is the cornerstone; 2) Both lessons of failure and success are powerful teachers; 3) Leaders need to narrate their stories because they offer extremely valuable insight 4) Mentoring evolves over time because it is a synthesis of ongoing events, experiences, observations and thoughtful analysis and 5) Mentoring is similar to a joint venture.

IV. SYSTEM DEVELOPMENT

In this section, we will discuss how Online Mentoring system is developed. It makes use of two tier architecture that acts as an interface between the mentor and the student. OMS is developed on a client-server model that has a user application on client side and the data source on the server side. This system is built under java runtime environment using complete object oriented programming techniques to handle the real world challenges in the system. The complete frontend is designed and developed with the help of J2EE architecture. The backend data is handled by MySQL and for generating the required reports iReport Designer is used.

Now let us see and understand in detail how this application is designed and developed in detail. The following figure 3 gives the complete architecture of the system, which depicts all the three users i.e. admin,

mentor and student and also inter-relationship between them. Overall the system contains like one admin under which many mentors and each mentor has set of students allocated by admin and at the same time the mentor is wittingly taking the students for giving valuable counseling for the improvement of the student in an academic institute. The architecture of E-Mentoring specified here is specific to the academic institution and if the mentoring is required in other institution or organization this architecture is not applied and has to be changed accordingly.
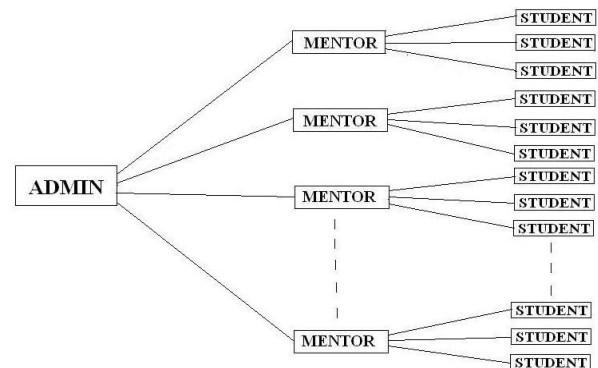

Fig. 2 Internal Architecture of the System

The user admin is similar to administrator of the system who manages the mentors as well as students. Admin only has the option to create login credentials to both the users and monitor over the actions performed by them. The whole system is controlled by the admin user. The better the process of mentoring goes on, the better results can be expected. The mentors also play a critical role by giving their right feedback to right students. The mentors are mediators between the admin users and the student user of the system. Mentors also provided with the login credentials by admin to login and check the information of the students and do analysis of each and every student assigned to him for mentoring then give his valuable feedback. Student user has his login for viewing the feedback given by their mentors. All these credentials and feedback information is maintained in the database server.

Here Fig. 3 represents the Entity-Relationship (E-R) diagram of Online Mentoring System which is useful in describing and designing the database used in implementing the OMS application. This figure shows entities, relationships, attributes, cardinalities, keys, weak entities, weak relationships etc. In the above figure, the attribute with three dots indicates that there are many attributes for that entity all of which are not showed here. The primary key among the attributes of an entity are underlined. Generally ID or No. attribute of an entity indicates the primary key of that entity.

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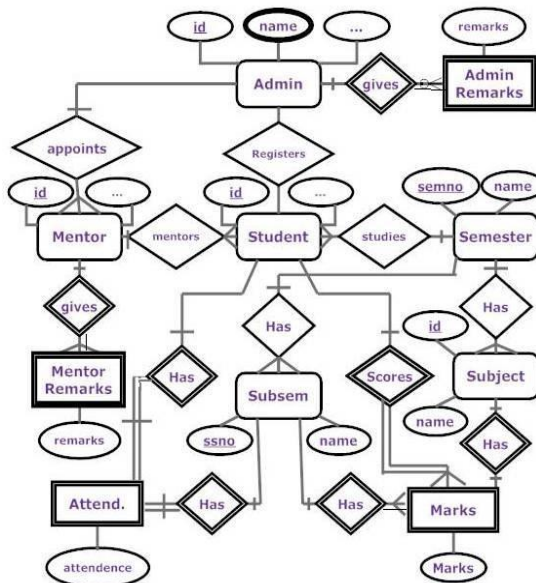**Available Online at www.ijeecse.com**

Fig. 3 Entity-Relationship Diagram

There are many important processes that are used in developing this system. Here we discuss about two processes from them and understand how they work 1) Creation of Student entities by the admin of the system and 2) Adding remarks on the students by the mentor. The flowcharts and the algorithms of these are briefed below.

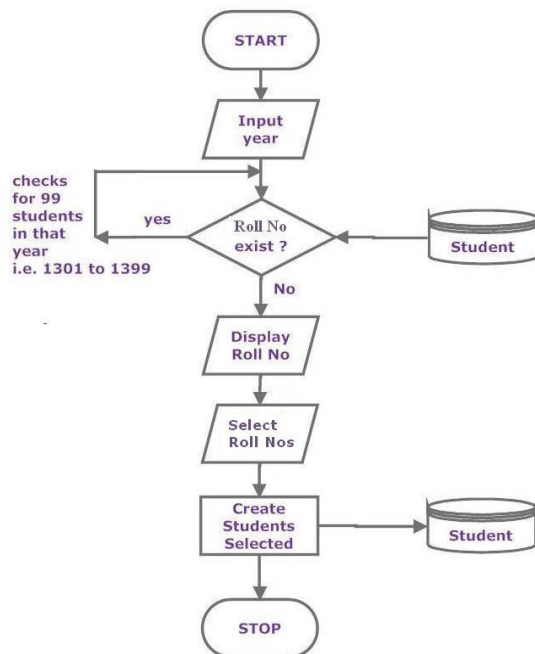The following is the flowchart for creating the student entities by the admin:

Fig. 4 Flow Chart for Creating Student by Admin

Algorithm for creating the student entities by admin is as follows:

Step 1: START

Step 2: Enter the input of required calendar year.

Step 3: Check for the pre-existence of any Roll No for the year given as input in the student database of the server.

Step 4: Repeat Step 3 until all the Roll No of the students is checked, maximum strength of students in a class is assumed as 99. For example if the code of a class in a college is 13, then Roll No of students can be from 1301 to 1399 only.

Step 5: After Step 4, display the remaining Roll No available for the creation of the student entities.

Step 6: Select the list of Roll No for which the admin wish to create the student entities.

Step 7: Create the new student entities with the selected Roll no as primary key and submit to the student database in OMS.
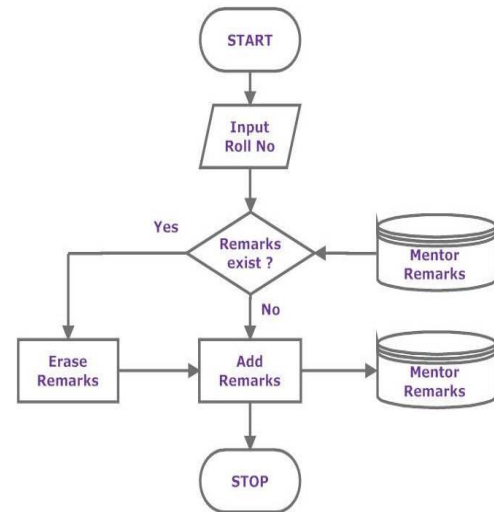
Step 8: STOP

Fig. 5 Flow Chart for Adding Remarks by the Mentor

Algorithm for adding remarks on the students by the mentor is as follows:

Step 1: START

Step 2: Mentor selects the one of the students allotted to him with the help of his Roll No.

Step 3: Check for any remarks if already existing or saved in the database.

Step 4: If the remarks exist then the mentor can either erase or edit the remarks.

![IJEECSE logo]

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Step 5: Otherwise the mentor can add new remarks and submit the same to the database in OMS.
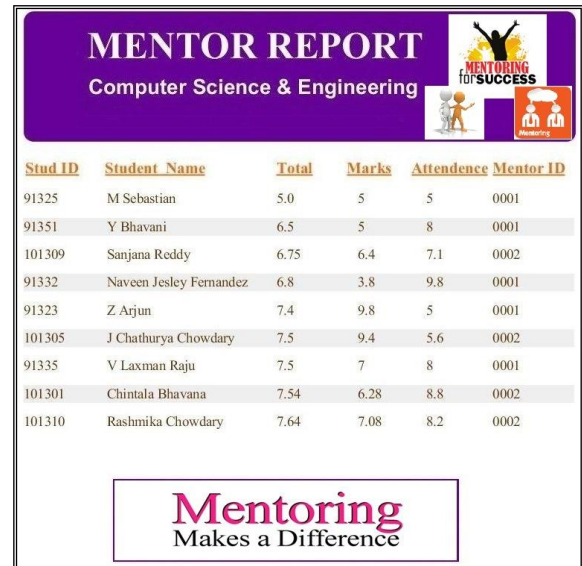
Step 6: STOP

V. RESULT

Online Mentoring System application is developed with the help of the concept of Software Development Life Cycle (SDLC) and implementing the architecture of J2EE. The following figure 6 shows the screenshot of Admin side application of OMS. This screenshot is viewable to the user admin only after signing in the application with the help of username and password provided to them. This screenshot shows various menu options with the Welcome message to the admin. The user admin is granted with various menu options like Mentor, Student, Analysis, Subject, Remarks, Settings and Help. Each of these main menu options contains submenus which contains different actions which are related to their corresponding menu. For example Mentor menu has submenus like Create Mentor, Edit Mentor, Search Mentor, Delete Mentor, View Mentor and Assign Students to Mentor etc. and similarly Student menu has submenus like Create Students, Edit Students, View Students, and Search Student etc. Similar to this there are other two applications for each of other two users i.e. Mentor application and Student application.

Figure 6 Screenshot of OMS Admin Application

The following figure 7 shows the screenshot of Mentor report of all the students in the Department of Computer Science and Engineering as viewed by the user admin in the application of Online Mentoring System, it consists of their ids, names, different types of ratings and also id of mentor allotted to them. This report contains the information of ratings of each and every student according to their attendance and the performance in the exams i.e. marks. Both the ratings of attendance and marks are scaled up to the maximum of 10. The total rating is calculated by weighted average of the ratings of attendance and marks. Here in this report, the attendance as well as marks ratings are given equal weightage 0.5 and 0.5, hence total rating is average of attendance and marks ratings. For example the student with Stud ID

91335 have got the rating of marks and attendance as 7 and 8 respectively, hence his total rating became average of both is 7.5. Mentor using this type of report can easily sort out and find out the students who need their immediate attention and guidance very easily.

Stud ID	Student_Name	Total	Marks	Attendence	Mentor ID
91325	M Sebastian	5.0	5	5	0001
91351	Y Bhavani	6.5	5	8	0001
101309	Sanjana Reddy	6.75	6.4	7.1	0002
91332	Naveen Jesley Fernandez	6.8	3.8	9.8	0001
91323	Z Arjun	7.4	9.8	5	0001
101305	J Chathurya Chowdary	7.5	9.4	5.6	0002
91335	V Laxman Raju	7.5	7	8	0001
101301	Chintala Bhavana	7.54	6.28	8.8	0002
101310	Rashmika Chowdary	7.64	7.08	8.2	0002

Figure. 7 Screenshot of OMS Mentor Report

VI. CONCLUSIONS

By this work, we conclude that e-mentoring in an academic institute can be developed and tremendous results can be achieved than traditional system. This system is user friendly and easy to use as it is based on simple client-server model. In future, one more important user, parent can also be added into the system. In addition to this it can also be programmed with android so that it will become a mobile application, hence converting this system into a Ubiquitous mentoring system which is easily accessible to parents as well as the mentors and students. Hence it will allow the mentors to dedicate more time whenever they wish and can give much precise feedback that will give proper guidance and right solution to the problems of students. The primary focus of this entire work is heart felt pain for the student life and to reduce suicide attempts made by students due to academic stress or other problems.

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